

Class 1 (Week 0): Upwards interfaces I, edge-driven domains

To do—let's leave going over this till the end of class today

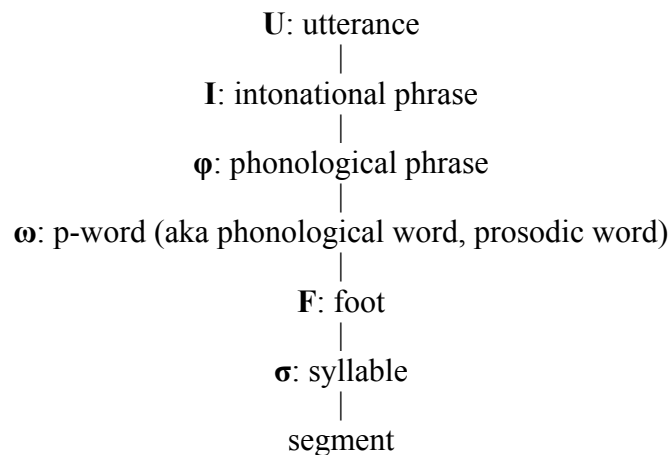
- Enroll in the class
- Check out CCLE page for readings
- Reading for Tuesday (Sept. 29):** Kaisse 1985, ch. 7
 - _____: prepare a 15-20 min. presentation of Kaisse's proposal and how it applies to her case studies (you may find that all six case studies is too much to present within the time allotted), with short handout
 - _____: prepare a 15-20 min. presentation where the ALIGN model presented today does its best to explain Kaisse's data (with handout), for at least two cases. You might find that the ALIGN account is successful, or you might demonstrate where and why it fails. Either way spell it out thoroughly.
- Reading for Tuesday (Sept. 29):** Pak & Friesner 2006
 - _____: prepare a 15-20 min. presentation of P&F's main findings and proposal, with short handout
 - _____: prepare a 15-20 min. presentation where you put yourself in the shoes of the 1985 version of Ellen Kaisse. Would any of P&F's findings surprise her? Confirm her predictions?

0. Business

- Introduce ourselves
- Syllabus (just the topics)

Overview of today. We're going to see one model of how syntax and phonology interact—namely, that syntactic constituent **edges** create phonological constituent edges, and phonological constituents serve as the domain of phonological processes. Next week we'll look at some amendments and alternatives.

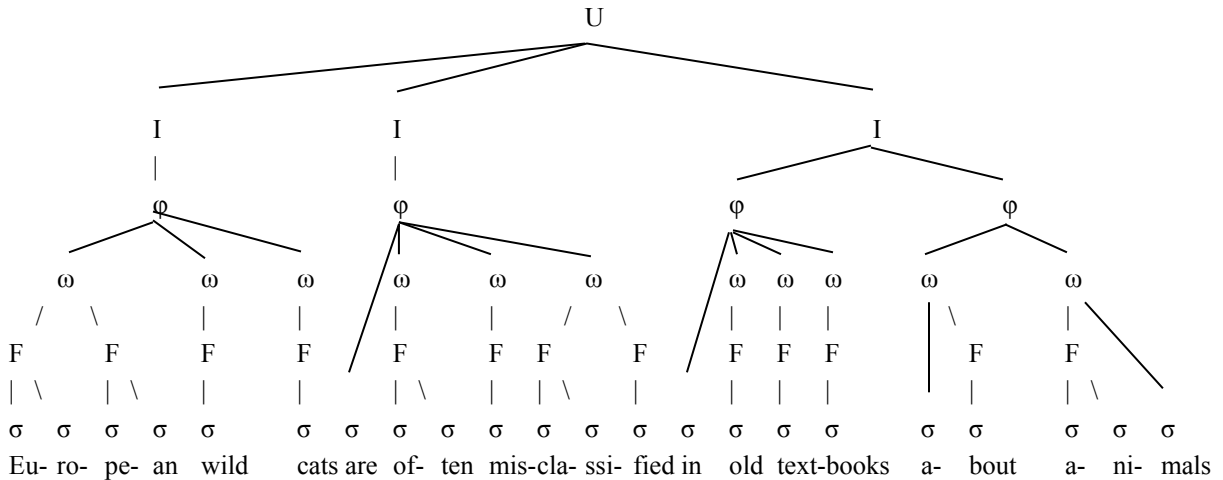
1. The prosodic hierarchy (Variant proposals exist, of course)



1.1 Bibliographic notes

- Papers by Selkirk in the late 1970s and early 1980s first proposed this hierarchy: (Selkirk 1978; Selkirk 1980a; Selkirk 1980b; Selkirk 1981).
- These papers defer discussion of certain questions to a forthcoming synthesis_i, and by the time it_i came out (Selkirk 1984), Selkirk had decided against the foot, p-word, and p-phrase.
- For a book-length presentation of the idea, see Nespor & Vogel 1986.

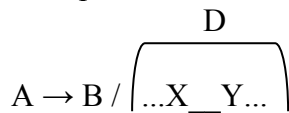
2. Example (loosely adapted from Nespor & Vogel 1986, henceforth N&V)



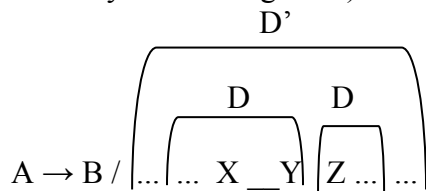
3. How domains work in Selkirk’s original model

(this is not her notation—I just made it up)

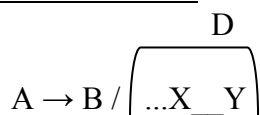
- domain span rules: the structural description must be contained within a certain domain



- domain juncture rules: the structural description refers to the boundary between two domains D, and is contained within a domain D' (D' is higher than D, but not necessarily the immediately dominating level)



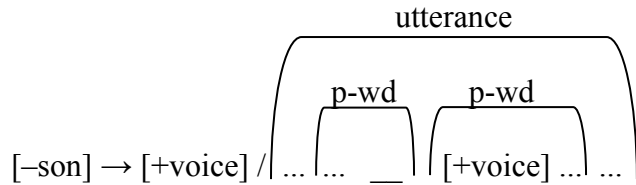
- domain limit rules: the structural description is at the edge of a domain D



4. Case study: Sanskrit p-word (Selkirk 1980a)

- A non-compound N, A, or V constitutes a p-word
- In a compound, the first stem constitutes a p-word, and the second stem plus suffixes constitute another p-word.

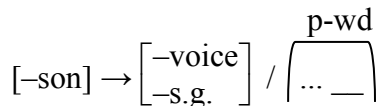
4.1 Example of word-junction rule (that is also utterance-span): Final Voicing (p. 115)



| | | | | |
|---|---------------|---|---------------|--------------------|
| (stem) _ω (stem) _ω (<i>compound</i>) | sat – aha | > | sad-aha | ‘good day’ |
| | samyak uktam | > | samyag uktam | ‘spoken correctly’ |
| (stem) _ω (stem) _ω | parivraṭ ayam | > | parivraḍ ayam | |
| | tat namas | > | tad namas | ‘that homage’ |
| (stem suffix) _ω | prāñc + aḥ | > | prāñcaḥ | |
| | vac + ya | > | vacya | |
| | marut + i | > | maruti | ‘wind (loc.)’ |

- How can we tell that a p-word juncture must intervene between target and following segment?

4.2 Example of word-limit rule: Final Deaspiration/Devoicing (p. 120)



| | | | | |
|---|------------|---|---------|------------------------------|
| (stem) _ω (stem) _ω | labh – sye | > | lap-sye | ‘I shall seize’ |
| | agnimath | > | agnimat | ‘producing fire by friction’ |
| | triṣṭubh | > | triṣṭup | |
| (stem) _ω | vīrudh | > | vīrut | ‘plant’ |
| | tad | > | tat | |
| | suhṛd | > | suhṛt | |

- Crucially, these changes are supposed to occur regardless of the word’s larger context (e.g., utterance-medial vs. utterance-final).

4.3 Example of word-span rule: *nati* in Classical Sanskrit (p. 123)¹

$$n \rightarrow \bar{n} / \overbrace{\dots \{s, r, \bar{r}, \bar{r}\} [-cor]_0 _ \{V, n, m, y, v\} \dots}$$

| | | | |
|---|---------------|---|------------|
| | karman + ā | > | karmaṇā |
| (stem suffix) _ω | dūṣ + anam | > | dūṣaṇam |
| | br̥mh + anam | > | br̥mhaṇam |
| | muṣ + nā + ti | > | muṣṇāti |
| (stem) _ω (stem) _ω | brahman - yaḥ | > | brahmanyah |
| | kṣip - nuḥ | > | kṣipnuḥ |

- Putting aside for now the question of where the p-word boundaries come from, how could we express p-word juncture, limit, and span in OT terms? I think there are multiple options...

5. Counteranalysis I: boundary symbols

- Let's use a richer inventory of symbols than SPE, say...
 - %: utterance boundary
 - @: intonational-phrase boundary
 - \$: p-phrase boundary
 - #: p-word boundary
 (assume a set of rules to insert these boundary symbols in the right places)
- Let's translate a rule or two from above into this notation

- Selkirk objects that this theory predicts lots of other rule types to be equally good.

- How about a rule like this: $A \rightarrow B / X (\#* \$*)^* Y (\#*)^* _ (\#* \$*)^* W (\$*)^* Z$

¹ Fake data: Selkirk gives data from Vedic Sanskrit, where *nati* was a p-phrase-span rule, and mentions that in Classical Sanskrit the rule was p-word-span, though it remained fossilized in some compounds. I've just taken her Vedic data and modified the compound examples, so it's probably wrong in various ways.

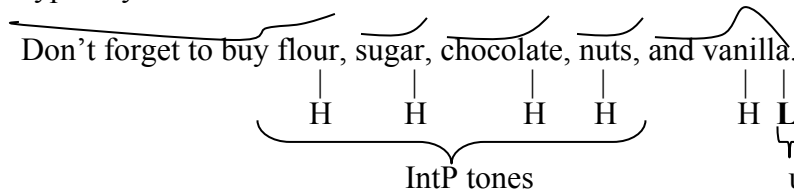
6. Counteranalysis II: lexical phonology

| | | | | | | | |
|---|-----------|----------------|----------|-----------|----------|------------|---------------|
| | sat, aha | parivraṭ, ayam | vac | labh, sye | triṣṭubh | karman | brahman, yaḥ |
| suffixation | -- | -- | vac + ya | -- | -- | karman + ā | -- |
| <i>nati</i> (was word-span) | -- | -- | -- | -- | -- | karmaṇā | -- |
| Final Deaspiration/Devoicing (was word-limit) | -- | -- | -- | lap, sye | triṣṭup | -- | -- |
| compounding | sat + aha | -- | -- | lap + sye | -- | -- | brahman + yaḥ |
| syntax | -- | parivraṭ ayam | -- | -- | -- | -- | -- |
| Final Voicing (was word-juncture on utterance domain) | sadaha | parivraḍ ayam | -- | -- | -- | -- | -- |

- o Discuss...

7. Utterances in more depth

- Rules for utterance construction thought to allow lots of variation within language, but in similar ways across languages.
- Utterance ≈ sentence, but sentences can sometimes combine into an utterance.
- We typically see an additional tone at the end:



(there are also some Ls in between, associated to the stressed syllables, but we won't worry about them)

7.1 Example: American English tapping (Nespor & Vogel 1986). Optional but possible:

((My brother bough[r] a parrot last week.)_{IntP})_U
 ((Camelo[r])_{IntP}, (our pet rabbit)_{IntP}, (usually hides when guests come)_{IntP})_U
 ((Although that was not the first story he wro[r])_{IntP}, (it was certainly the last one)_{IntP})_U
 ((Please have a sea[r].)_{IntP} (I'll be right back)_{IntP})_U

- o Let's assume that tapping is impossible in the example below. So where are the U boundaries?
 Where's Sco[t̚]? Orville, open the window, will you?

7.2 Defining the utterance

It's not well understood what allows some pairs of sentences to be in same U, but it seems (N&V)...

- They have to both be short.
- The speaker can't actually pause in between (lengthening is OK).
- They have to be addressed to the same listener.
- There has to be some syntactic, semantic, or pragmatic relationship between the two, such as
 - Ellipsis: Martha didn't invite Sco[r]. I did ____.
 - Anaphora: Where's Pa[r]_i? I need him_i.
 - Implied *and*: You invite Charlo[r]. I'll invite Joan.
 - Implied *therefore* or *because*: It's la[r]. I'm leaving.
Take your coa[r]. It's cold out.

7.3 Example 2: r-linking in non-rhotic English (Gussenhoven & Jacobs 1998, Nespor & Vogel 1986)²

- [ɹ] is inserted between {ə, a, ɔ} (and other vowels, depending on the dialect) and a following V. Underlying *r* gets pronounced only when followed by a V.

| | |
|-------------------------------------|---------------|
| gnaw[ɹ]ing | lu[ɹ]ing |
| Anna [ɹ] arrived | a fai[ɹ] idea |
| Hi Sheila[ɹ]! Everything all right? | |
| Hide the vodka[ɹ]. Alvin's coming. | |

- Why not here?
Hi Lana[ɹ]! *Open the window, Sheila.

Some other alternations whose domain is claimed to be the U

- voicing assimilation in obstruent clusters in Sanskrit (Selkirk 1980a)
- voicing assimilation in obstruent-C clusters in Mexican Spanish (Harris 1969)
- final devoicing in Mexican Spanish

8. Intonational phrases in more depth

- In general, the end of an IntP is marked by a tone of some kind.
- IntPs vary a lot depending on speaking rate and style, but similarly across languages.
 - Caveat: Accentual phrases aren't in the original hierarchy but have been proposed for some languages instead of the phonological phrase. They also vary a lot by rate and style.
- 'Core' subject-predicate sentence usually forms one IntP. But...

² see McCarthy 1999 for additional restrictions in one American dialect

- Parenthetical remarks, non-restrictive relatives, tag questions, vocatives, interjections, and extraposed adjuncts usually get their own IntPs (Nespor & Vogel 1986).

(Writers from across Canada gathered,) (appropriately enough,) (at the Arts and Letters Club on Thursday night [...])³

(Larry Spinak,) (who goes by the nickname Spi,) (is another of those people who come up with projects that make you desire to stay home from work and carve some wood.)⁴

(In press reports of the incident,) (his name wasn't mentioned.)
vs. (His name wasn't mentioned in press reports of the incident.)

- An additional IntP boundary can go after a long subject DP, or after each item in a list (and even at the end of a long list).

(The most important reason why using tables for layout is bad) (is that they don't degrade gracefully.)⁵
cf. (The reason is that they don't degrade gracefully)

(Merck discovers), (develops), (manufactures) (and markets) (a broad range of innovative products to improve human and animal health,) (directly and through its joint ventures.)⁶
cf. (Merck manufactures and markets a broad range ... health)

8.1 Example: Dutch adverbial stress retraction (Gussenhoven & Jacobs 1998)⁷

(bold marks biggest stresses of sentence)

(Naar de **w**áterstanden luistert ze **alt**ijd)_{IntP}
to the water.level.reports listens she always

(Waar ze **alt**ijd naar luistert)_{IntP} (zijn de **w**áterstandend)_{IntP}
where she always to listen is the water.level.reports

(**Á**ltijd luistert ze naar de **w**áterstanden)_{IntP}
always listens she to the water.level.reports

(Ze luistert **á**ltijd naar de **w**áterstanden)_{IntP}
she listens always to the water.level.reports

³ From the Toronto *Globe and Mail*. These are just my own guesses at how I might phrase these sentences.

⁴ From carvingworld.com, “an online resource for woodcarvers and woodworkers”.

⁵ From davespicks.com

⁶ From merck.com

⁷ For the last three sentences, I'm just guessing at the glosses and translations—maybe Jos can help!

8.2 Example: nasal place assimilation in Spanish (from Nespov & Vogel)

/n/ /n/ /n/
 (Tenía[n̩] diez ca[n̩]gueros en u[n̩] parque muy cerca de aquí)
 they.have 10 kangaroos in a park very close of here

/n/ /n/ /n/ /n/
 (U[n̩] gra[m] balcó[n̩]), (como sabe[n̩]), (puede ofrecer mucho placer)
 a large balcony as they.know can offer much pleasure

/n/ /n/ /n/ /n/
 (Carme[n̩]), (cá[n̩]tanos una nueva ca[n̩]ció[n̩]), (por.favor)
 Carmen sing-us a new song please

9. P-phrase in more depth

- Rules for phonological-phrase construction thought to allow little variation and to differ parametrically across languages
- Simple version
 - The left edge of every XP begins a new p-phrase
 - or, The right edge of every XP ends a p-phrase
 - or, The left edge of every lexical head X begins a new p-phrase
 - or, The right edge of every X ends a p-phrase
- More-complex example: Italian, according to N&V
 - Moving from right to left, mark a p-phrase boundary at the end of a constituent containing a lexical head X (prepositions don't count; copulas and auxiliary verbs are iffy)
 - End it when you hit a constituent containing a lexical head outside of X's maximal projection (or the beginning of a sentence).
 - Optionally, if X's complement forms a non-branching (i.e., single-word) p-phrase to the right of X, join it into X's p-phrase.

9.1 English examples (same rule as Italian)

(Jennifer)_φ(discovered)_φ(that her attic)_φ(had been invaded)_φ(last winter)_φ(by a family)_φ(of squirrels)_φ

(My sister)_φ(còmmandéers)_φ(trúcks)_φ(for fun)_φ
 or (My sister)_φ(còmmandéers trúcks)_φ(for fun)_φ

| |
|---|
| <p>English Rhythm Rule is p-phrase-span: <i>thirtéen mén</i> → <i>thirtèen mén</i> But see Hammond 1999 on frequency effects</p> |
|---|

10. How to get prosodic domains in OT? Let's try it for Chi Mwiini (Kisseberth 2000)

Dialect of Swahili formerly w/ 40,000 speakers in Somalia; most emigrated to Kenya.

- Vowel length is contrastive—minimal pairs:
 x-ku.la 'to grow' x-kuu.la 'to extract'
 x-pe.le.ka 'to send' x-pee.le.ka 'to be sweepable'
- LENGTHEN: **within a p-phrase** (i.e., when not phrase-final), word-final vowels lengthen
 na 'by' **naa** no.ka 'by a snake'
 hu.jo 'one who eats' hu.**joo** mbe.le 'the one who eats first'

| /hujo mbele/ | LENGTHEN | DEP-μ |
|---------------------------------------|----------|-------|
| ☞ (hu.joo mbe.le) _{p-phrase} | | * |
| (hu.jo mbe.le) _{p-phrase} | *! | |

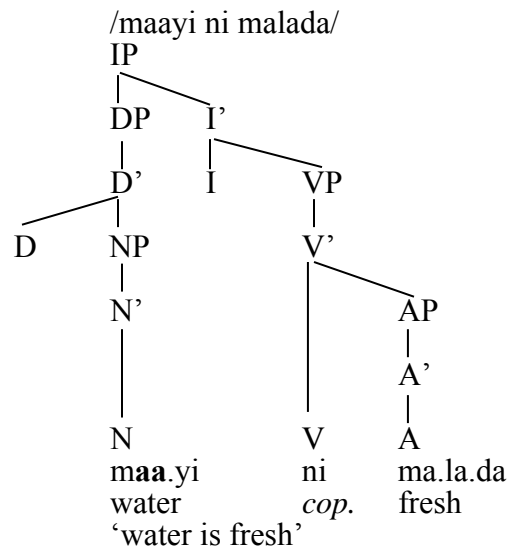
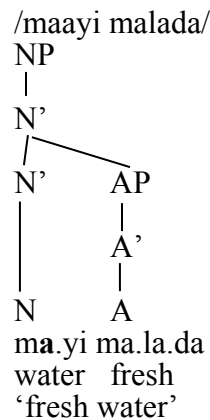
- WINDOW: long vowels allowed only in penult or antepenult of a **p-phrase** (probably conflates a few constraints). Can cause shortening and block lengthening.

x-soo.ma 'to read' ('window' where long Vs are allowed is underlined)
x-soo.m-e.sh-a 'to teach'
 x-so.m-e.sh-a.ña 'to teach each other'

| /x-soom-esh-aña/ | WINDOW | MAX-μ |
|--|--------|-------|
| (x-soo.m-e.sh-a.ña) _{p-phrase} | *! | |
| ☞ (x-so.m-e.sh-a.ña) _{p-phrase} | | * |

(I'm leaving out some interesting stuff like *HEAVYHEAVY)

- Kisseberth's rule: end of XP projects end of p-phrase. Old-school trees:



- Where are the p-phrase boundaries?
- Why shortening in the first case but not the second?
- Your thoughts on whether this still works in contemporary syntax?
- Starting with McCarthy & Prince 1993 itself, there have been proposals to do this kind of thing with ALIGN, especially Selkirk 1995.
 - What ALIGN constraints will capture the location of P-phrase boundaries in Chi Mwiini?

| | | |
|------------|---|--|
| | [[maayi] _N [malada] _{AP}] _{NP} | |
| <i>a</i> | (([[maayi] _N [malada] _{AP}] _{NP}) | |
| <i>b</i> ☞ | (([[mayi] _N [malada] _{AP}] _{NP}) | |
| <i>c</i> | (([[maayi] _N) ([malada] _{AP}] _{NP}) | |
| <i>d</i> | (([[mayi] _N) ([malada] _{AP}] _{NP}) | |

| | | |
|------------|---|--|
| | [[maayi] _{DP} [[ni] _V [malada] _{AP}] _{VP}] _{IP} | |
| <i>a</i> ☞ | (([[maayi] _{DP}) ([[ni] _V [malada] _{AP}] _{VP}] _{IP}) | |
| <i>b</i> | (([[mayi] _{DP}) ([[ni] _V [malada] _{AP}] _{VP}] _{IP}) | |
| <i>c</i> | (([[maayi] _{DP} [[ni] _V [malada] _{AP}] _{VP}] _{IP}) | |
| <i>d</i> | (([[mayi] _{DP} [[ni] _V [malada] _{AP}] _{VP}] _{IP}) | |

10.1 Challenges to Lexical Phonology, if you recall from last year

- What level must the tableaux above be happening at?
- What about bracket erasure?
- Ideas for modifying the theory?

10.2 Weird predictions (if time; see Blumenfeld 2006):

- It should be possible to change the phrasing to accommodate segmental constraints.
 - What would happen if MAX-μ were ranked between the two ALIGN constraints?

11. If we have time: other jobs of the prosodic hierarchy

11.1 Domain of initial strengthening

- Fougeron & Keating 1997 (see there for brief literature review): explicitly compares domain-initial, -medial, and -final positions for utterance, intonational phrase, p-phrase, and p-word.
- “Reiterant speech” versions, using the syllable “no”, of sentences like “(89+89)*(89+89) = a lot”:

(((eighty-nine)_ω)_φ((plus)_ω(eighty-nine)_ω)_φ((times)_ω)_φ((eighty-nine)_ω)_φ((plus)_ω(eighty-nine)_ω)_φ)_{IP}(=a lot)_{IP})_U

- Linguopalatal contact for [n] (% electrodes in electropalate contacted; left-side graphs) greater in initial position, for utterance, intonational phrase, and phonological phrase (not so much for p-word).

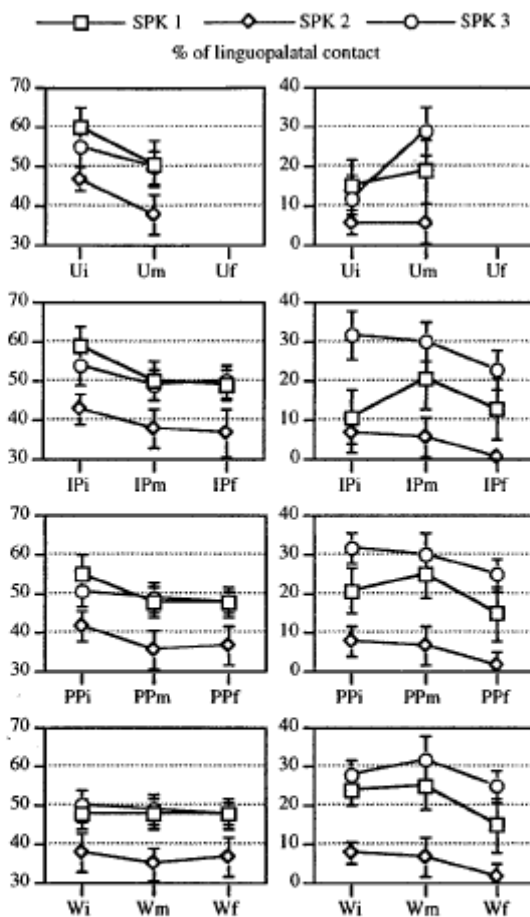


FIG. 3. Maximum linguopalatal contact for /n/’s (left) and minimum linguopalatal contact for /o/’s (right) in three positions (initial, medial, final) in each of the four prosodic domains (utterance, intonational phrase, phonological phrase, word). Speaker results are shown separately within each panel. See Table II for significance of comparisons. All data from all speakers are included here, coded exclusively. A more extreme articulation is more contact for /n/ and less contact for /o/.

(p. 3732)

11.2 Domain of final lengthening

- Notice in the right-side graphs above that contact is less for [o] in final position of the three measurable domains—i.e., the vowel is lower or backer. Could reflect final lengthening.
- A frequently-cited work on final lengthening is Wightman et al. 1992

0 \approx word-clitic boundary

1 \approx p-word boundary

2 \approx accentual-phrase boundary

3 \approx p-phrase or intermediate-phrase boundary

4 \approx intonational-phrase boundary

5 \approx “superior major tone group” boundary

6 \approx utterance boundary

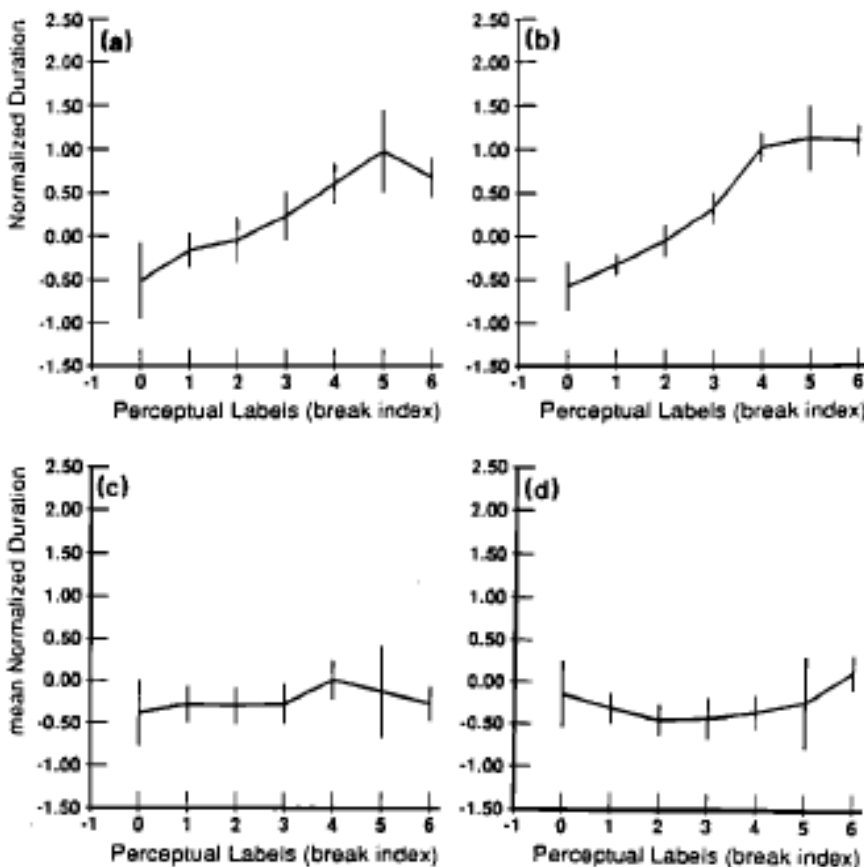


FIG. 4. Mean normalized duration versus the break index of the largest perceived boundary within a foot plotted for four preboundary regions within the foot: (a) The coda consonants of the last syllable before the boundary, (b) the vowel nucleus of the final syllable before the boundary, (c) all segments between the final stressed vowel and the final vowel, and (d) the final stressed vowel before the boundary. Cases (c) and (d) occur only when the word-final vowel is unstressed. The vertical bars correspond to confidence intervals: If the mean at one index is above or below the bar associated with another, the difference in lengthening associated with those two indices is statistically significant (95% protection level).

(p. 1714)

11.3 Prominence assignment in stress languages

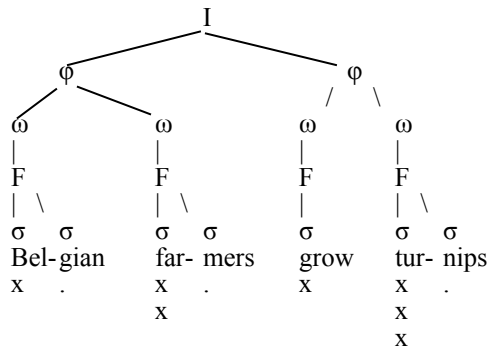
syllable: may bear stress, but doesn't have to

foot: may bear at most one

p-word: must bear stress

p-phrase: can be domain of stress-adjustment rules (e.g., English rhythm rule)

p-phrase and higher: relative prominence is assigned to the stresses contained within the domain



References

- Blumenfeld, Lev. 2006. Constraints on Phonological Interactions. Stanford Ph.D. Dissertation.
- Bresnan, Joan, Anna Cueni, Tatiana Nikitina & Harald Baayen. 2007. Predicting the dative alternation. In G Boume, I Kraemer & J Zwarts (eds.), *Cognitive foundations of interpretation*, 69–94. Amsterdam: Royal Netherlands Academy of Science.
- Embick, David & Rolf Noyer. 2001. Movement operations after syntax. *Linguistic Inquiry* 32(4). 555–595.
- Fougeron, Cécile & Patricia Keating. 1997. Articulatory strengthening at edges of prosodic domains. *The Journal of the Acoustical Society of America* 101(6). 3728. doi:10.1121/1.418332.
- Gussenhoven, Carlos & Haike Jacobs. 1998. *Understanding Phonology*. Oxford: Oxford University Press.
- Harris, James W. 1969. *Spanish Phonology*. Cambridge, Mass.: MIT Press.
- Hayes, Bruce. 1995. *Metrical Stress Theory: principles and case studies*. The University of Chicago Press.
- Kisseberth, Charles. 2000. The phonology-syntax interface: Chimwiini revisited. Manuscript. Tel Aviv University, ms.
- McCarthy, John J. 1999. *A note on Boston r and the Elsewhere Condition*. Amherst, Mass.
- McCarthy, John J & Alan Prince. 1993. Generalized Alignment. In Geert E Booij & Jaap van Marle (eds.), *Yearbook of Morphology*, 79–153. Dordrecht: Kluwer.
- Nespor, Marina & Irene Vogel. 1986. *Prosodic Phonology*. Dordrecht: Foris.
- Schutze, Carson. 1994. Serbo-croatian second position clitic placement and the phonology-syntax interface. *MIT Working Papers in Linguistics* 21. 373–473.
- Selkirk, Elisabeth. 1978. On prosodic structure and its relation to syntactic structure. In T. Fretheim (ed.), *Nordic Prosody*, vol. 2, 111–140. Trondheim: TAPIR.
- Selkirk, Elisabeth. 1980a. Prosodic domains in phonology: Sanskrit revisited. In Mark Aronoff & Mary-Louise Kean (eds.), *Juncture*, 107–129. Saratoga, CA: Anma Libri.
- Selkirk, Elisabeth. 1980b. The role of prosodic categories in English word stress. *Linguistic Inquiry* 11. 563–605.
- Selkirk, Elisabeth. 1981. On the nature of phonological representation. In J. Anderson, J. Laver, T. Meyers, J. Anderson, J. Laver & T. Meyers (eds.), *The Cognitive Representation of Speech*. Amsterdam: North Holland.
- Selkirk, Elisabeth. 1984. *Phonology and Syntax: The Relation between Sound and Structure*. Cambridge, Mass.: MIT Press.
- Selkirk, Elisabeth. 1995. The prosodic structure of function words. In Jill Beckman, Laura Walsh Dickey & Suzanne Urbanczyk (eds.), *University of Massachusetts Occasional Papers: Papers in Optimality Theory*, 439–470. Amherst, Mass.: GLSA Publications.

- Wightman, C W, S Shattuck-Hufnagel, M Ostendorf & P J Price. 1992. Segmental durations in the vicinity of prosodic phrase boundaries. *The Journal of the Acoustical Society of America* 91(3). 1707–1717.
- Yu, Kristine Mak. 2008. The prosody of second position clitics and focus in Zagreb Croatian. University of California, Los Angeles M.A. thesis. www.linguistics.ucla.edu/general/matheses/Yu_UCLA_MA_2008.pdf.
- Zec, Draga & Sharon Inkelas. 1991. The place of clitics in the prosodic hierarchy. In D. Bates (ed.), *The Proceedings of the West Coast Conference on Formal Linguistics 10*. Stanford: Stanford Linguistic Association.